

QUESTION 1**0.25 points** Saved

Which problem will be caused if the following schedule is executed?

Transaction A	Transaction B
	read_item(X)
	X:=X+N
read_item(X)	
X:=X-M	
	write_item(X)
	read_item(Y)
write_item(X)	
	Y:=Y-N
	write_item(Y)

- ☒ The lost update problem. Item X has an incorrect value because its update by transaction B is lost.
- ☐ The incorrect summary problem. As transaction A reads X after it was updated by transaction B, the wrong summation is computed.
- ☐ The unrepeatable read problem. Transaction A read the same item X twice but X was changed between the two reads.
- ☐ The temporary update problem. As transaction B must roll back, transaction A read the temporary incorrect value of X.

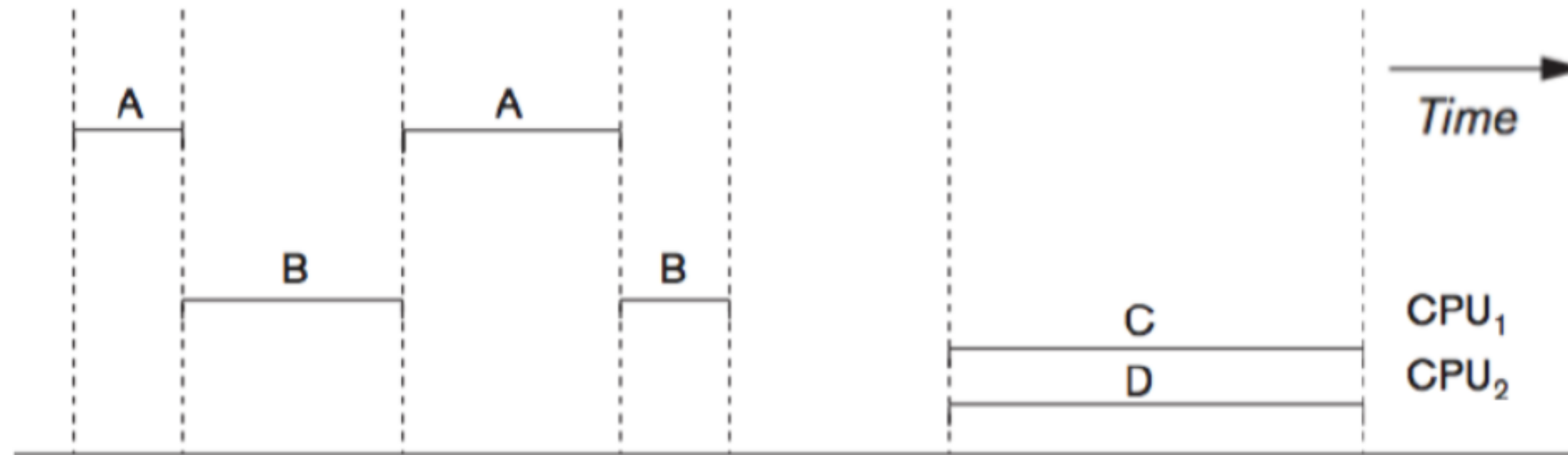


QUESTION 2

0.25 points

Save Answer

Given the following diagram, which of the statement is correct about transactions C and D.



- ☐ 1. Transaction C and D are concurrently processed using interleaved processing
- ☒ 2. Two processors (CPUs) are required to process transactions C and D
- ☐ 3. Transactions C and D are not concurrent.
- ☐ 4. Transaction C started before transaction D

QUESTION 3**0.25 points**

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Which of the following schedules describes the given transaction execution:

T2	T3
read_item(X)	
read_item(Y)	
	read_item(X)
	read_item(Y)
	Y:=X+Y
	write_item(Y)
X:=X+Y	
write_item(X)	

- ☐ r2(Y), r2(Y), r3(Y), r3(X), w3(X), w2(X)
- ☐ r2(X), r2(Y), r3(Y), r3(Y), w3(Y), w2(X)
- ☒ r2(X), r2(Y), r3(X), r3(Y), w3(Y), w2(X)
- ☐ r3(X), r3(Y), r2(X), r2(Y), w2(Y), w3(X)

?

QUESTION 4

0.5 points

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Consider three transactions T1 and T2 with the following schedule:

r2(X); w2(X); r1(X); w1(X); r1(Y); w1(Y); c1; c2;

Which of the following statement is true?

- ☐ The given schedule is serializable
- ☐ The given schedule is not serializable
- ☒ The given schedule is serial

QUESTION 5

0.75 points

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According to the transaction state diagram, you have learned, order the states of a committed transaction between begin_transaction and terminated.

- 2 partially committed
- 1 active
- 3 committed

?

QUESTION 6

0.25 points

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When a transaction is executed, it should take the database from one consistent state to another. This describes which transaction property?

- ☐ 1. Atomicity
- ☒ 2. Consistency preservation
- ☐ 3. Durability
- ☐ 4. Isolation

QUESTION 7**0.5 points**

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Given the following schedule and initial values of $X=10$, $Y=20$, $M=5$.

T1	T2
read_item(X)	
	read_item(X)
	read_item(Y)
$X:=X-M$	
	$X:=X+Y$
write_item(X)	
	write_item(X)
read_item(Y)	
$Y:=Y+M$	
write_item(Y)	

After executing the above schedule, the value of $X =$ ✓ and $Y =$ ✓ .



QUESTION 8

0.25 points

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Given the following schedule when 2PL is used:

T1	T2
read_lock(X)	
read_item(X)	
	read_lock(Y)
	read_item(Y)
write_lock(Y)	
	write_lock(X)

If you know that $TS(T1) = 5000$ and $TS(T2) = 3000$; what will happen to T1 if the wound-wait strategy is followed?

- ☐ T1 will be aborted
- ☐ T2 continues its execution
- ☐ Nothing and there will be a deadlock.
- ☒ T1 will wait

?

QUESTION 9

0.25 points

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Consider item X with the following information:

item	Value	read_TS	write_TS
X	20	3000	3000

Given the following schedule:

line#	T1	T2
1	read_item(X)	
2	X:=X+1	
3		read_item(X)
4		X:=X-1
5	write_item(X)	
6		write_item(X)

If you know that $TS(T1) = 2000$ and $TS(T2) = 3000$; what will happen to **T1** when executing line#1 when **basic timestamp ordering** is used?

- ☐ T1 will wait
- ☒ T1 will execute read_item(X) and do not change read_TS(X) ✕
- ☐ T1 will abort, roll-back and reject
- ☐ T1 will execute read_item(X) and change read_TS(X) to 2000

?

QUESTION 10

0.25 points

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If three transactions T1, T2 and T3 were executing concurrently using a validation scheme with the following times for each phase:

Transaction	Read phase	Validation phase	Write phase
T1	starts at 500 ... ends at 1000	starts at 1000 ... ends at 1500	starts at 1500 ... ends at 2000
T2	starts at 3500 ... ends at 4000	starts at 4000 ... ends at 4500	starts at 4500 ... ends at 6000
T3	starts at 4200... ends at 6500	current time	

If you knew that there are **no common items between the read and write sets** of all three transactions, **what will happen to T3?**

- ☐ Validation of T3 will be successful and updates are applied to the database.
- ☒ Validation of T3 will be failed and T3 will be aborted.



QUESTION 11

1 points

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Consider the following entries in the recovery log after the system crashed:

```
[begin_transaction, T1]
[write_item, T1, X, 10, 15]
[commit, T1]
[begin_transaction, T2]
[begin_transaction, T3]
[write_item, T2, Y, 5, 7]
[write_item, T3, X, 15, 7]
[checkpoint]
[write_item, T3, Y, 7, 10]
[commit, T3]
[abort, T2]
[begin_transaction, T4]
[write_item, T4, X, 10, 15]
```

Fill in the blanks using either word **nothing**, **undone** or **redone**:

- During the recovery, T1 will be ~~redone~~ nothing
- During the recovery, T2 will be
- During the recovery, T3 will be
- During the recovery, T4 will be ~~nothing~~ undone



QUESTION 12

0.25 points

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In distributed database systems, increasing the capacity of each node is known as:

- ☒ Vertical scalability
- ☐ Horizontal scalability
- ☐ Availability
- ☐ Reliability

QUESTION 13

0.25 points

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If the original database has the following table for STORAGE company:

ID	Name	Quantity	Source
1234	A4 paper	10	China
4567	Cheese	70	Italy
5125	Tomato	50	Egypt
1524	Chair	35	China

If the company has three sites, the database is distributed among them as follows:

Site A:

ID	Name	Quantity
1234	A4 paper	10
4567	Cheese	70
5125	Tomato	50
1524	Chair	35

Site B:

ID	Name	Quantity
1234	A4 paper	10
1524	Chair	35

Site C:

ID	Name	Quantity	Source
4567	Cheese	70	Italy
5125	Tomato	50	

What is the type of **fragmentation** applied to the database in **site B**?

- ☐ Horizontal fragmentation
- ☒ Hybrid fragmentation
- ☐ Vertical fragmentation

?